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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/716,662

11/20/2003

Tomoyuki Akiyama

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05/23/2007

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EXAMINER

DIACOU, ARI M

ART UNIT

PAPER NUMBER

3663

MAIL DATE

DELIVERY MODE

05/23/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/716,662	Applicant(s) AKIYAMA, TOMOYUKI	
	Examiner Ari M. Diacou	Art Unit 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1, 3-7, 13, 15, 20, 22 and 26 is/are allowed.
- 6) ☒ Claim(s) 8-12, 14, 16-19, 21, 23-25, 27 and 28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2-15-2007 has been entered.

Response to Arguments

2. In the remarks filed 2-15-2007, applicant argued the following:
- A. On page 10, that "it would not be obvious to one of ordinary skill in the art to remove polarization rotator 66 to couple two separate TE waves in a multiplexer prior to amplification."
 - B. On page 10, that Daganais does not teach a phase controller as claimed.
 - C. On page 10, that Dagenais et al. further fails to disclose a gain equalizer.
 - D. On pages 10-11, that 22 and 26 are dependent off of an allowed parent claim and should not be rejected.
 - E. On page 11, that 13 and 15 are dependent off of an allowed parent claim and should not be rejected.
 - F. On page 12, that the combination cited has two inputs and two outputs and the claims claim a single amplifier.

G. On page 12, that "As a final note, it appears there was some confusion on the Examiner's part regarding the claims identified in each rejection and the arguments the Examiner made directed to those claims. See, for example, the incomplete sentence on page 7 starting with "Regarding claim 6...."

3. Argument A is unconvincing, while applicant is correct in the narrow sense of what argument A is saying, one of ordinary skill in the art knows that the object is to make a depolarized pump light, and would make the modification if TM modes were designed to pass.
4. Argument B is convincing, however a new grounds of rejection is presented.
5. Argument C is unconvincing, a gain equalizer is not claimed.
6. Argument D is convincing, the rejections are hereby withdrawn.
7. Argument E is convincing, the rejections are hereby withdrawn.
8. Argument F is unconvincing, as stated in the last action, the insertion of the word "single" is not of sufficient specificity to amend over the art. There is no reason why one of skill in the art would not reasonably consider 2 amplifiers connected to the same substrate as a "single" amplifier, under the motivation to combine given in the office action dated 3-20-2006.
9. Argument G is noted, the offending typo has been removed, Examiner is unaware of any others.

EXAMINER'S AMENDMENT

10. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with William L. Brooks on 5-17-2007.

Page of Remarks	Regarding Claim	Line of claim	Change
2	1	2	demultiplexer for dividing <u>configured to divide</u>
2	1	3	input paths for inputting <u>configured to input</u>
2	1	7	and amplifying <u>configured to amplify</u>
2	1	8	multiplexer for coupling <u>configured to couple</u>
2	1	10	splitter for dividing <u>configured to divide</u>

Allowable Subject Matter

11. Claims 1, 3-7, 13, 15, 20, 22, and 26 are allowed.
12. Regarding claim 1, the prior art does not teach or make obvious the use of
- a single semiconductor optical amplifier having two separate input paths configured to input said two components of light outputted from said demultiplexer, each of said input paths of said semiconductor optical amplifier including an active layer that has one type of structure selected from a group composed of a quantum dot, a quantum wire, a quantum dash, and a quantum well, and configured to amplify both of said components of a light outputted from said demultiplexer;

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within the context of claim 1 taken as a whole.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

16. Claim 8, 9, 23 and 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dagenais et al. (USP No. 7002733). Dagenais discloses an optical repeater, comprising:

- a demultiplexer for dividing an inputted light into a TE wave and a TM wave; [Fig. 6, #64]
- a converter for converting the TM wave into a TE wave; [Fig. 6, #65]
- a multiplexer [Fig. 6, #67]

but fails to disclose:

- the multiplexer combining a TE wave with a TE wave
- or a semiconductor optical amplifier including an active layer that has one type of structure selected from a group composed of a quantum dot, a quantum wire, a quantum dash, and a quantum well.

In another embodiment, Dagenais teaches that an SOA may have a quantum well structure [Col. 5, line 23]. Therefore, it would have been obvious to one skilled in the art (e.g. an optical engineer) at the time the invention was made, to remove the polarization rotator 66 if the application of module 60 did not require two polarizations to be output. It is well settled in case law that the removal of an unnecessary component is an obvious modification by those skilled in the art.

17. Regarding claim 9, the parent claim being rejected over Dagenais or Dagenais in view of Uchizaki above, Dagenais further discloses dividing the inputted light into a TE and a TM wave.

18. Regarding claim 23, all gain equalizers and amplifiers inherently work in a limited range, and if manufactured by man-made processes, work in a limited predetermined range.

19. Regarding claim 27, all amplifying repeaters re-amplify the signal, and are therefore 1R repeaters.

20. Regarding claim 28, a demultiplexer that splits TE from TM modes is inherently a polarization beam splitter that divides inputted light into TE and TM modes..

21. Claims 12 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dagenais or Dagenais in view of Uchizaki above, and further in view of Kinoshita et al. (USP No. 6023366). Dagenais and Uchizaki disclose the invention with all the limitations of claims 1 and 8, but fail to disclose ALC support structure. Kinoshita teaches:

- an input detector for detecting an intensity of the inputted light; [Fig. 12, #146] [Col. 13, lines 49-55].

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- a variable optical attenuator for attenuating a light outputted from said multiplexer; [Fig. 12, #156]
- an output detector for detecting an intensity of a light outputted from said variable optical attenuator; and [Fig. 12, #162] [Col. 13, lines 7-26]
- an output controller for controlling an intensity of an output signal by controlling operation of said variable optical attenuator based on the intensity detected by said output detector. [Fig. 12, #164] [Col. 13, lines 7-26]

Therefore, it would have been obvious to one skilled in the art (e.g. an optical engineer) at the time the invention was made, to include an optical attenuator based ALC , for the advantage of increased control of the gain spectral profile.

22. Claims 10-11, 14, 16, 18, 19, 21, and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dagenais in view of Uchizaki as applied to parent claims above, and further in view of Kim (and in the case of 12 and 17, further in view of Kinoshita). Dagenais, Uchizaki and Kinoshita disclose the inventions with all the limitations of claims 1, 8, 12 and 17 above but do not teach monolithic integration of (de)multiplexer and SOA, Kim teaches the optical repeater wherein said demultiplexer and said multiplexer are monolithically integrated into a PLC with said semiconductor optical amplifier. [Fig. 4] [¶ 0022] Therefore, it would have been obvious to one skilled in the art (e.g. an optical engineer) at the time the invention was made, to monolithically fabricate the multiplexer, demultiplexer and SOA, for the advantage of compact manufacture.

Conclusion

23. While patent drawings are not drawn to scale, relationships clearly shown in the drawings of a reference patent cannot be disregarded in determining the patentability of claims. See In re Mraz, 59 CCPA 866, 455 F.2d 1069, 173 USPQ 25 (1972).

24. The references made herein are done so for the convenience of the applicant. They are in no way intended to be limiting. The prior art should be considered in its entirety.

25. The prior art which is cited but not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ari M. Diacou whose telephone number is (571) 272-5591. The examiner can normally be reached on Monday - Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AMD 5/17/2007


JACK KEITH
SUPERVISORY PATENT EXAMINER